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Charles Edward Pickering

THE PROGRESS OF SCIENCE

CHARLES EDWARD PICKERING

THE nation and the world are losing the men of science who in the last generation were its leaders. It may be that among their survivors, increased tenfold in numbers, there are ten times as many men of equal ability and performance. That is for the next generation to decide; for us the men who pass away seem to be irreplacable in their work and most of all in the distinction of their personal qualities.

While America was dependent on foreign nations for research in most of the sciences it maintained a certain leadership in astronomy. This appears to have been due to the fact the observatories were endowed here in which opportunities were offered for research, to which scientific men could devote their entire time and energies. Three outstanding astronomers were Newcomb, Hill and Pickering. They worked by diverse methods. Hill on his farm at Nyack was isolated from all organization. Newcomb used the Naval Observatory and was both aided and hampered by the government's provision for astronomical work. Pickering, the head of a college observatory, made in large measure his own opportunities by his remarkable powers of organization.

John Pickering, who settled in Salem in 1642 founded a distinguished New England family; his great grandson, Charles Edward Pickering, was born in Boston in 1846. He died on February 3 in the house of the director of the Harvard College Observatory, active, until stricken by pneumonia, with the work he had conducted for forty-two years.

Pickering became full professor of physics in the Massachusetts Institute of Technology at the age of twenty-two. He there introduced the laboratory method of teaching physics unknown elsewhere and carried on important experimental work on light and on other subjects related to astronomy. In 1877 he was appointed to be the successor of Winlock as director of the Harvard College Observatory.

Pickering devoted himself and the resources of the Harvard College Observatory in large measure to the then undeveloped science of astrophysics, with the fruitful results described in some eighty volumes published by the observatory. Photometric and photographic work was undertaken by new methods and on a scale not before imagined. For example, in a few years three times as many variable stars were detected there as had been discovered in the whole history of astronomy. Two million measurements of the light of 80,000 stars have been made at Harvard, and the results have been the discovery of three fourths of the known 5,000 variable stars. Two telescopes have taken photographs, the plates of which weigh eighty tons. An observatory was established at Arequipa to obtain corresponding results in the southern hemisphere.

The organization of work on such a great scale with extensive equipment and many observers and computers, controlled by one man, was a development of science comparable with the modern organization of industry in America. It does not supersede the need of men such as Hill or Willard Gibbs, but it gives a new and powerful method for the advancement of science congenial to the genius of organized democracy.

The industrial trusts have obtained control by the suppression of rivals. Here the methods of Pickering were the exact reverse, and set standards which we may hope will ultimately prevail. He not only obtained large endowments for the Harvard Observatory and perfected its methods, but was equally active in assisting and organizing astronomical work throughout the country and the world. He was by common consent the permanent president of the American Astronomical Society. All astronomers and many not astronomers are his debtors for counsel and help. Others will take up and carry forward the astronomical work that Pickering originated and organized. His place as a man with other men will remain unfilled.

A NATIONAL DEPARTMENT OF EDUCATION

A BILL has been introduced in the Senate and the House creating a department of education with a secretary of education and appropriating money for educational work in cooperation with the states. The bill has the support of the National Education Association and the American Federation of Labor. It can not be passed before March 4, but efforts will be made to have the subject considered by the next congress.

Other leading nations have a ministry of education, but here education has been held to be a state function. The present bill is indeed not intended to interfere with the autonomy of the states, but, like the bill that has been adopted to promote vocational education, would distribute money to the states on condition that they appropriate equal amounts for the same purposes. The states and local authorities would retain exclusive administration and control of education within their respective jurisdictions, the federal government exercising supervision only to the extent necessary to see that the amounts appropriated are used by the states for the purposes specified in the bill. The allotments would be paid to the states quarterly and disbursed on the order of the state's chief educational authority, as designated by the state legislature.

The bill authorizes an annual appropriation of $100,000,000, to be apportioned among the states for the following purposes: (1) To encourage the states in the removal of illiteracy, $7,500,000. (2) To encourage the states in the Americanization of foreigners, $1,500,000 (3) To encourage the states in the equalization of educational opportunities, and for the partial payment of teachers' salaries, providing better instruction, extending school terms and otherwise providing equally good schools for all children, $50,000,000. (4) To encourage the states in the promotion of physical and health education and recreation, $20,000,000. (5) To encourage the states in providing facilities for preparing and supplying better teachers, $15,000,000.

In the hearings that have been held before the House education committee, as reported in the New York *Tribune*, striking facts have been brought to light showing the extent to which the illiteracy evil exists in the United States. The selective draft alone brought out the fact that there were 700,000 illiterate males in this country between the ages of twenty-one and thirty-one, unable either to understand the principles for which they were called upon to fight or to read the Constitution they were expected to defend. Altogether, it has been testified by experts, there are at the present